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| APPLICATION NO.                | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--------------------------------|-------------|----------------------|---------------------|------------------|
| 10/616,710                     | 07/10/2003  | Dean M. Homan        | 19.0317             | 2628             |
| 23718                          | 7590        | 09/21/2007           | EXAMINER            |                  |
| SCHLUMBERGER OILFIELD SERVICES |             |                      | SCHINDLER, DAVID M  |                  |
| 200 GILLINGHAM LANE            |             |                      | ART UNIT            | PAPER NUMBER     |
| MD 200-9                       |             |                      |                     | 2862             |
| SUGAR LAND, TX 77478           |             |                      |                     |                  |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                    |              |  |
|------------------------------|--------------------|--------------|--|
| <b>Office Action Summary</b> | Application No.    | Applicant(s) |  |
|                              | 10/616,710         | HOMAN ET AL. |  |
|                              | Examiner           | Art Unit     |  |
|                              | David M. Schindler | 2862         |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 15 June 2006 and 12 July 2006.  
 2a) This action is FINAL.                            2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1,2,5-10,12,13,15-23 and 25-43 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) 18-23,25-33 is/are allowed.  
 6) Claim(s) 1,6-10,13,15-17,34-38 and 40-43 is/are rejected.  
 7) Claim(s) 12 is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 10 July 2003 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_

4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_

5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_

**DETAILED ACTION**

1. This action is in response to the communications filed 6/15/2006 and 7/12/2006.

***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the 1) features of claim 8, 2) the features of claim 9, the features of claim 20, 3) the features of claim 21, 4) the features of claim 35, and 5) the features of claim 36 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of

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the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

3. The disclosure is objected to because of the following informalities: Applicant submitted a new specification on 6/15/2006 that appears to contain changes over the previous amendment. It appears that Applicant is intending for this specification to be a substitute specification; however, this substitute specification does not appear be proper under MPEP 714 and 37 CFR 1.125. To this, the Examiner notes 37 CFR 1.125 which states in part:

"(b) Subject to § 1.312, a substitute specification, excluding the claims, may be filed at any point up to payment of the issue fee if it is accompanied by a statement that the substitute specification includes no new matter.

(c) A substitute specification submitted under this section must be submitted with markings showing all the changes relative

to the immediate prior version of the specification of record. The text of any added subject matter must be shown by underlining the added text. The text of any deleted matter must be shown by strike-through except that double brackets placed before and after the deleted characters may be used to show deletion of five or fewer consecutive characters. The text of any deleted subject matter must be shown by being placed within double brackets if strike-through cannot be easily perceived. An accompanying clean version (without markings) must also be supplied. Numbering the paragraphs of the specification of record is not considered a change that must be shown pursuant to this paragraph."

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 34-38 and 40-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to Claim 34,

The phrase "the conductive loop" on the last two lines lacks antecedent basis. Furthermore, the difference between the conductive loop and the test loop is unclear.

As to Claims 35-38 and 40-43,

These claims stand rejected for incorporating the above rejected subject matter.

As to Claim 37,

This claim appears to fail to further limit in that the claimed subject matter of this claim appears to be included in claim 34.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou (5,293,128) in view of Tabarovsky et al. (Tabarovsky) (6,308,136).

As to Claim 1,

Zhou discloses disposing a test loop about the electromagnetic logging tool such that the axis of the tool and a plane on which the test loop lies form a tilt angle that is between about 0 and 90 degrees (Figure 3), measuring a signal induced in one of the antennas when another of the antennas is energized, the induced signal being affect by the test loop ((Column 4, Lines 45-58) and (Column 5, Lines 1-14)), and determining a correction for the induced signal ((Column 7, Lines 55-68) and (Column 8, Lines 1-17)).

Zhou does not disclose including producing a corrected signal and comparing the corrected signal with a calculated signal based on a model including electromagnetic logging tool and the test loop.

Tabarovsky discloses producing a corrected signal and comparing the corrected signal with a calculated signal based on a model ((Column 5, Lines 15-67) and (Column 6, Lines 1-20)).

It would have been obvious to a person of ordinary skill in the art to modify Zhou to include producing a corrected signal and comparing the corrected signal with a calculated signal based on a model including electromagnetic logging tool and the test loop given the above disclosure and teaching of Tabarovsky in order to determine whether obtained data is consistent (Column 6, Lines 8-20).

As to Claim 2,

Zhou discloses step (c) includes applying to the induced signal a correction consisting of a sonde error correction ((Column 7, Lines 53-58) and (Column 8, Lines 1-15)).

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou (5,293,128) in view of Tabarovsky et al. (Tabarovsky) (6,308,136) as applied to claim 1 and in further view of Holladay, III et al. (6,534,985).

Zhou in view of Tabarovsky discloses as explained above.

Zhou discloses a test loop (14) about an electromagnetic logging tool (10) and repeating steps (b) to (c) (Column 7, Lines 13-15).

Zhou in view of Tabarovsky does not disclose altering a position of the test loop.

Holladay, III et al. discloses altering a position of the test loop (Cx) (Column 12, Lines 8-16).

It would have been obvious to modify Zhou in view of Tabarovsky to include altering a position of the test loop as taught by Holladay, III et al. in order to mount the test loop (Cx) at the optimum location (Column 12, Lines 12-16).

10. Claims 6, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou (5,293,128) in view of Tabarovsky et al. (Tabarovsky) (6,308,136) as applied to claim 1 and in further view of Gao et al. (6,393,364).

As to Claim 6,

Zhou in view of Tabarovsky discloses as explained above.

Zhou in view of Tabarovsky does not disclose deriving calibration coefficients for at least one of the antennas.

Gao et al. discloses deriving calibration coefficients for at least one of the antennas ((Column 6, Lines 12-17) and (Column 8, Lines 17-20)).

It would have been obvious at the time of the invention to modify Zhou in view of Tabarovsky to include deriving calibration coefficients for at least one of the antennas as

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taught by Gao et al. in order to obtain a better approximation of the horizontal conductivity ((Column 5, Line 2) and (Column 8, Lines 19-20)).

As to Claim 8,

Zhou in view of Tabarovsky does not disclose at least one of the antennas includes a plurality of coils having mutually orthogonal axis.

Gao et al. discloses at least one of the antennas includes a plurality of coils ((Rx), (Ry), and (Rz)) having mutually orthogonal axis (Figure 1).

It would have been obvious at the time of the invention to modify Zhou in view of Tabarovsky to include at least one of the antennas includes a plurality of coils having mutually orthogonal axis as taught by Gao et al. in order to generate estimates of certain features of earth formations (Abstract, Lines 3-10).

As to Claim 9,

Zhou in view of Tabarovsky does not disclose at least one of the antennas includes a plurality of coils having non-parallel axes.

Gao et al. discloses at least one of the antennas includes a plurality of coils ((Rx), (Ry,) and (Rz)) having non-parallel axes (Figure 1).

It would have been obvious at the time of the invention to modify Zhou in view of Tabarovsky to include at least one of the antennas includes a plurality of coils having non-parallel axes as taught by Gao et al. in order to generate estimates of certain features of earth formations (Abstract, Lines 3-10).

11. Claims 7, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou (5,293,128) in view of Tabarovsky et al. (Tabarovsky) (6,308,136) as applied to claim 1 and in further view of Bittar (6,476,609).

As to Claim 7,

Zhou in view of Tabarovsky does not disclose the tilt angle is 45 degrees.

Bittar discloses the tilt angle is 45 degrees (Column 14, Lines 38-41).

It would have been obvious at the time of the invention to modify Zhou in view of Tabarovsky to include the tilt angle is 45 degrees as taught by Bittar in order to enable a solution for the horizontal conductivity ((Column 11, Lines 12-16) and (Column 12, Lines 2-3)).

As to Claim 16,

Zhou discloses disposing a test loop (14) about the

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electromagnetic logging tool (10) such that the axis of the test loop is concentric with an axis of receiver antennas ((R1) and (R2)) ((Figure 3) and (Column 9, Lines 14-16)),

Zhou in view of Tabarobsky does not disclose step (b) includes rotating the test loop about the axis of the tool.

Bittar discloses tilted receiver antennas tilted ((R1) and (R2) of Figure 2) on a logging tool (Figure 2).

It would have been obvious to modify Zhou in view of Tabarobsky to include tilted receiver antennas as taught by Bittar in order to enable a solution for the horizontal conductivity ((Column 11, Lines 12-16) and (Column 12, Lines 2-3)).

It is noted that by tilting the test loop to be concentric with the receiver antennas, the test loop is rotated about the axis of the tool. It would therefore have been obvious at the time of the invention to modify Zhou in view of Tabarobsky to include step (b) includes rotating the test loop about the axis of the tool given the above Bittar disclosure in order to enable a solution for the horizontal conductivity ((Column 11, Lines 12-16) and (Column 12, Lines 2-3) as found in Bittar).

As to Claim 17,

Zhou discloses disposing a test loop (14) about the

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electromagnetic logging tool (10) such that the axis of the test loop is concentric with an axis of receiver antennas ((R1) and (R2)) ((Figure 3) and (Column 9, Lines 14-16)),

Zhou in view of Tabarovsky does not disclose step (b) includes displacing the test loop off the axis of the tool.

Bittar discloses tilted receiver antennas tilted ((R1) and (R2) of Figure 2) on a logging tool (Figure 2).

It would have been obvious to modify Zhou in view of Tabarovsky to include tilted receiver antennas as taught by Bittar in order to enable a solution for the horizontal conductivity ((Column 11, Lines 12-16) and (Column 12, Lines 2-3)).

It is noted that by tilting the test loop to be concentric with the receiver antennas, the test loop is displaced off the axis of the tool. It would therefore have been obvious at the time of the invention to modify Zhou in view of Tabarovsky to include step (b) includes displacing the test loop off the axis of the tool given the above Bittar disclosure in order to enable a solution for the horizontal conductivity ((Column 11, Lines 12-16) and (Column 12, Lines 2-3) as found in Bittar).

12. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou (5,293,128) in view of Tabarovsky et al.

(Tabarovsky) (6,308,136) as applied to claim 1 and in further view of Applicant's Admitted Prior Art (AAPA).

Zhou in view of Tabarovsky disclose as explained above.

Zhou in view of Tabarovsky does not disclose the at least one antenna have its axis at an angle includes a transverse antenna.

AAPA discloses the at least one antenna have its axis at an angle includes a transverse antenna (Page 1, Paragraph [0013]).

It would have been obvious to a person of ordinary skill in the art to modify Zhou in view of Tabarovsky to include the at least one antenna have its axis at an angle includes a transverse antenna as taught by AAPA in order to provided for EM measurement with directed sensitivity (Page 1, Paragraph [0013]).

13. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou (5,293,128) in view of Tabarovsky et al. (Tabarovsky) (6,308,136) as applied to claim 1 and in further view of Mayer (4,338,664).

Zhou in view of Tabarovsky do not disclose multiplying the corrected signal by gain or phase factors.

Mayer discloses multiplying a calculated signal by a multiplication factor (Column 10, Lines 50-59).

It would have been obvious to a person of ordinary skill in the art to modify Zhou in view of Tabarovsky to include multiplying the corrected signal by a gain factor given the above disclosure and teaching of Mayer in order to allow a user to vary the factor with different measurements (Column 10, Lines 50-59).

14. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou (5,293,128) in view of Tabarovsky et al. (Tabarovsky) (6,308,136) as applied to claim 1 and in further view of Twist (5,159,577).

Zhou in view of Tabarovsky disclose as explained above.

Zhou in view of Tabarovsky does not disclose step (c) includes determining a maximum or minimum value associated with the measured signal.

Twist discloses step (c) includes determining a maximum or minimum value associated with the measured signal (Column 4, Lines 32-49).

It would have been obvious at the time of the invention to modify Zhou in view of Tabarovsky to include step (c) includes determining a maximum associated with the measured signal as taught by Twist in order to generate a correction signal to

correct for the effects of eccentering of the detector signals  
(Column 4, Lines 59-61).

**Allowable Subject Matter**

15. Claims 18-23, and 25-33 are allowed.
16. Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
17. Claims 34-38 and 40-43 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.
18. The following is an examiner's statement of reasons for allowance:

As to Claim 12,

The primary reason for the allowance of claim 12 is the inclusion of deriving a gain or phase factor by comparing the corrected signal with the calculated signal. It is these features found in the claim, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Response to Arguments***

19. Applicant's arguments with respect to the pending claims have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David M. Schindler whose telephone number is (571) 272-2112. The examiner can normally be reached on Monday-Friday (8:00AM-5:00PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Assouad can be reached on (571) 272-2210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

David M. Schindler  
Examiner  
Art Unit 2862

DMS

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